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ABSTRACT

The major goal of the University of Southern Maine Reading Academy Project was to demonstrate the effectiveness of process-oriented, diagnostic/prescriptive instruction by trained tutors in raising the literacy levels of adults reading at less than a sixth grade equivalency level. Preservice and inservice training using an empirical model of reading development was provided to students who served as tutors to approximately 240 adults. It was hypothesized that the extent of students' gains in literacy and self concept would correlate highly with the extent of tutors' adherence to the specified program. The procedure for measuring program implementation involved translating the process-oriented approach to reading instruction into specific, observable teacher behaviors and measuring their effectiveness. This was accomplished through specification of essential components of the model program, development and use of tutor interviews and rating scales to collect data on program implementation, and analysis of data by means of a multiple regression equation. Student achievement in reading and changes in students' self concept were measured by the Adult Basic Learning Examination and the Self Esteem Inventory. Extent of program implementation was shown to be the factor that weighted most heavily on prediction of residual posttest scores. (YLB)

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The Design and Validation of a Process-Oriented Staff Development Program in Adult Literacy

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ABSTRACT:

The major goal of the University of Southern Maine Reading Academy Project was to demonstrate the effectiveness of process-oriented, diagnostic/prescriptive instruction by trained tutors in raising the literacy levels of adults reading at less than a sixth grade equivalency level. The research project was conducted under a national basic skills demonstration grant. Preservice and inservice training using an empirical model of reading development was provided to graduate and undergraduate students who served as tutors to approximately 240 adults. The program evaluation was designed to demonstrate that the extent of students' gains in literacy and self-concept could be predicted on the basis of the extent of program implementation. The research problem involved translating a process-oriented approach to reading instruction into specific, observable teacher behaviors and measuring their effectiveness. The steps taken to accomplish this included specification of all essential components of the model program, development and use of tutor interviews and rating scales to collect data regarding program implementation, and analysis of data by means of a multiple regression equation. Extent of program implementation was shown to be the factor which weighted most heavily on prediction of residual posttest scores.

CE035507

PROGRAM AREA:	Adult Literacy
PROJECT TITLE, LOCATION:	Reading Academy University of Southern Maine Gorham, Maine 04038
DEVELOPED BY:	Graduate Reading Program College of Education University of Southern Maine Gorham, Maine 04038
SOURCE OF FUNDING:	Title II, Basic Skills Improvement, Out-of-School Project
YEARS OF PROJECT OPERATION:	1980-1982
YEARS OF VALIDATION RESEARCH:	1981-1982

PROGRAM DESCRIPTION:

The University of Southern Maine Reading Academy provides basic literacy instruction for out-of-school youth and adults utilizing undergraduate and graduate students as tutors. Their training and their clients' instruction follows a process-oriented, diagnostic/prescriptive model.

A unique element of the program is the background and training of the tutors. The basic reading course which is required as a prerequisite for tutoring provides tutors with a developmental view of literacy acquisition. The course work enables them to diagnose reading competency and to design instruction according to each student's stage of reading development (see figure 1, page 4). These skills are further refined in the twenty-four hours of Reading Academy staff development that tutors attend during the academic year.

Instruction according to this model is based on contemporary research in reading and language which documents that learning to read involves progression through several distinct, sequential stages. The characteristics and competencies of the reader at each stage are reflected in

distinctly different instructional goals and practices. The task of the tutor is to identify a student's reading stage, generate instructional goals that reflect knowledge of the stage, and implement instruction using materials chosen on the basis of their level of difficulty and the student's expressed goals and interests. This orientation to reading as a developmental, language-based (psycholinguistic) process is summarized in figure 1, page 4. This approach stands in distinct contrast to most commercial adult reading programs such as The General Education Series (Steck-Vaughan Publishing Company), The Mott Basic Language Skills Program (Allied Education Council Publishing Company), and Programmed Reading for Adults (McGraw Hill Publishing Company) which are based on an extensive hierarchy of sequential isolated skills to be mastered. The Academy Model for the Development of Literacy on the other hand, is a "process-oriented" approach to literacy instruction and is essentially holistic; the majority of instructional time is spent reading and writing connected discourse rather than doing analytic exercises. While the rationale for such an approach is widely accepted in the field of literacy, the resulting model has not previously been described in sufficient detail to document its effectiveness. This, in fact, was accomplished in the Reading Academy evaluation.

POPULATION STUDIED:

The Reading Academy served 240 adults between 1980 and 1982. During the second year of federal funding (1981-82) 90 clients were served by 26 tutors. Sixty-seven of these students were used in the evaluation. (The remaining 23 were eliminated because of incomplete data; some moved and others were enrolled for less than two months.) The students used in the evaluation were representative of the general

UNIVERSITY OF SOUTHERN MAINE

Reading Academy Model for the Development of Literacy*

STAGE OF READING PROGRESS	STUDENT ENTRY CHARACTERISTICS	READER LEVEL	MAJOR INSTRUCTIONAL GOALS	INSTRUCTIONAL APPROACHES TO BE USED
I. Pre-Reading	• cannot read at all	non-reader	• develop positive attitudes • promote concept/language development and print awareness • develop visual and auditory discrimination and cross-sensory integration	• language experience approach • directed listening activities
II. Initial	• reads some words • communicates ideas • matches words and letters • recognizes letters • associates sounds with letters	0-2	• develop sight vocabulary • promote balanced application of word recognition strategies; use of context, phonics and word structure	• language experience approach • trace-reading or other immersion techniques • collection of mastered sight words • teacher-made follow-up activities focusing on word recognition strategies
III. Rapid Development or Transitional	• reads at approximately second reader level • recognizes 75-150 sight words • applies word recognition aids • reads independently with direction	2-4	• promote automaticity of word recognition (fluency)	• Directed Reading Activities at instructional level • extensive silent reading practice at independent level • trace reading or other immersion techniques • practice activities using common words that cause difficulty
IV. Wide Reading	• reads at approximately fourth reader level • uses reading functionally • reads independently	4-6	• encourage wide independent reading • promote multi-level comprehension • develop meaning vocabulary • promote specialized reading competencies	• Directed Reading Activities at instructional level • wide reading at independent level • oral and written activities designed to promote multi-level comprehension • meaning vocabulary notebook for structured study of new vocabulary encountered in reading • study skills activities related to functional reading materials
FUNCTIONAL LITERACY				
V. Refinement	• reads at approximately sixth reader level • uses reading functionally	6+	• expand instruction undertaken at preceding stage	

*Summarized from Teaching the Stages of Reading Progess, by M. P. O'Donnell, and the Reading Academy Component Checklist used in staff development and evaluation.

Figure 1

population served by the Academy. Most were Caucasian; 11 women and 56 men were included. The high proportion of men was due in part to the inclusion of an all male correctional population. Ages ranged from 17 to 65; over half were under 30. Sixteen had had less than seven years of schooling. The majority had attended high school, but only 12 had completed grade 12. Approximately one-third were employed full-time. The sample is representative of the populations characteristically served by adult basic education programs throughout the state.[1]

DEVELOPMENT OF THE EVALUATION STUDY

During the initial year of the project (1980-81), all elements of the model were field tested, and the delivery of all program components was refined. In preparation for the subsequent year's evaluation, pre and posttest data were collected from a sample of 1980-81 program participants. The data consistently revealed marked gains in students' functional literacy skills. In addition, many students remarked on changes in attitude and improved self concept they had experienced along with growth in literacy. Although the preliminary data looked promising, it was apparent that the more traditional evaluation designs would not be appropriate for documenting the program's effectiveness.

The special circumstances of adult basic education students must be considered in designing research that involves this population. Traditional experimental designs and norm-referenced comparisons are impractical for several reasons. The experimental design requires a control group. Even when a population with similar characteristics

1. Maine State Department of Adult Education

can be located, the ethics of pre and posttesting illiterate adults without providing instruction are highly questionable; adult basic education students find testing a particularly threatening and unpleasant experience. Comparison of an experimental group to a norm is unconvincing because there are no standardized normative tables for adult tests of basic literacy. The lack of access to either control groups or to normative data precluded the use of either of the two traditional evaluation designs. Moreover, the validation studies of the standardized adult achievement tests do not include multiple time measures; therefore a one-group time series could not be used.

The evaluation design chosen for the 1981-82 study and the instrumentation used evolved from the preliminary evidence that the instructional model is demonstrably effective in producing reading gains in students. If these gains were due primarily to the intervention, it was hypothesized that the extent of student gains would correlate highly with the extent of tutors' adherence to the specified program. To test this supposition, three tasks were clearly necessary: 1) to specify and categorize all essential components of the model program, 2) to measure the extent of its implementation by each tutor with each student and 3) to determine the contribution of measured extent of program implementation to program outcomes.

In order to demonstrate the effectiveness of the project, a multiple regression evaluation design which incorporated the three steps was selected. In simple linear regression, it can be demonstrated that if a dependent measure (Y) is equal to an independent measure (X) times some consonant (b), the size of the constant (b) expresses the relationship between X and Y while the correlation

coefficient (r) expresses the degree of such relationship. In this equation when the value of the independent measure (X) is zero, the dependent measure is equal to some constant (a). Using this design the constant "a" represents no treatment and the constant "b" represents the treatment effect. The same simple relationship holds true but is much more difficult to visualize in multiple regression. The regression design seemed uniquely appropriate to the Reading Academy evaluation, however, since it predicts residual posttest score which has had the effects of pre-existing differences removed. Through this design "no treatment expectation" may be inferred, and attribution of outcomes to program variables can be demonstrated.

The equation used, in its general form is as follows:

$$Y = b_1x_1+b_2x_2 \ldots b_ix_i+a$$

Where: Y = residual posttest score

b_1x_1 = the b weight times the first independent variable
b_2x_2 = the b weight times the second independent variable

b_ix_i = the b weight times the independent variable of i independent variables
a = some constant not attributed to the individual variables (no treatment effect)

EVIDENCE OF EFFECTIVENESS:

Instrumentation: Three primary measures were used in the evaluation study: one for program implementation and two for outcomes (reading and self concept).

The procedure for measuring program implementation was developed by the project staff. It was necessary to translate the process-oriented Reading Academy model into specific, observable tutor behaviors and to measure their application. This was accomplished through development of a Component Checklist using a methodology created at the University of Texas Research and Development Center (Hall and Loucks, 1978) and

refined for use in a major research study by The NETWORK, Inc. (Loucks and Crandall, 1981). Construction and use of the Component Checklist took place in the following manner:

1. Detailed descriptions were developed of diagnostic procedures, program management, instructional strategies recommended for each major stage of reading progress, and supervision of tutors.

2. Ideal, acceptable, and unacceptable tutor behaviors in implementing the program were designated for every program component in each of the four categories and listed on a comprehensive Component Checklist. (Staff development during the year 1981-82 focused exclusively on ideal implementation of the program for students at each stage of reading development).

3. Tutor interview sheets were developed according to the Component Checklist and rating scale described above. Site coordinators were trained to conduct tutor interviews, and to rate tutors' implementation of each program as ideal, acceptable, or unacceptable. Questions regarding special situations were anticipated, and group "decision rules" for scoring were made. Staff members were instructed to write annotations or explanatory notes in the space provided on the interview sheets whenever they were unsure as to the assignment of a rating to a particular component.

4. Each site coordinator was assigned tutors from other sites to interview. The interviewing of tutors by the site coordinator responsible for their supervision was thus avoided, maximizing the objectivity of interviewing. An interview was conducted and interview sheets filled out for every tutor - student pair in the program; all interviews were completed during January and February of 1982.

5. The following numerical rating scale was used to describe "extent of program implementation" for each program component:

   IDEAL = 2
   ACCEPTABLE = 1
   UNACCEPTABLE = 0

A member of the project staff examined every completed interview sheet, translated interviewers' component ratings and comments into numerical form using the above scale, and prepared all interview data for the evaluator. This step occurred during and after posttesing of students

(March 1982); however, a different member of the staff recorded post-test scores. The internal reliability of these program implementation ratings (Coefficient Alpha) is r - 0.80. As a result of this procedure scores for extent of program implementation were obtained for each student.

Student achievement in reading was measured by the Adult Basic Learning Examination (ABLE). This test, which has three levels, was selected because the reading component was most appropriate for the group participants in southern Maine. The reliability of the reading test (KR-20) ranges between 0.86 and 0.99 depending upon the sample selected and the level. This is considered acceptable reliability for an adult reading test. Even though there are no standardized normative tables for the ABLE, or indeed, for any other adult tests of basic literacy, authors of the ABLE have conducted validation studies using data from a North Carolina prison group, a Connecticut Youth Corps group, and an armed forces (USAFIR) group.

The reading test components reflect content accepted by reading specialists as essential to the reading process; on this basis the authors claim content validity. Moreover, the ABLE has been widely used in federally funded Adult Basic Education programs, Right to Read projects, and Basic Skills programs to measure their effectiveness.

Form A of the reading subtest from the appropriate level of the ABLE was administered to each student at the time of entry into the program. Form B of the same level reading test was administered as a posttest. The six site coordinators administered all ABLE tests to students at their sites to ensure consistency of testing procedures.

The Self Esteem Inventory (Coopersmith, 1967) was selected to measure changes in students' self concept that took place during their participation in the program. Since the inventory contains a number of items that seem inappropriate to an adult population, modifications were made. Of the original 24 items, 11 were deleted and 7 new questions pertaining specifically to respondents' feelings about education or reading ability were added. The resultant "modified Coopersmith," which consists of 20 items, was administered orally by tutors to each literacy student at the beginning and end of the instructional program.

A test of the internal reliability of the modified instrument was run; the Coefficient Alpha is $r = .67$.

CREDIBILITY OF EVIDENCE:

Throughout the study, precautions were consistently taken to ensure the objectivity of data collection and credibility of evidence provided by the data. All ABLE tests, for example, were administered by the six site coordinators, who had received identical instructions as to the procedures for administration. The tests were returned to the central office for scoring by one staff member who was not involved in instruction. Furthermore, all participants were given informal assessments of reading competency prior to ABLE testing to establish the appropriate level of the ABLE for their testing.

The tutor-interviewing procedures for measuring extent of program implementation were also structured for maximum objectivity. Site coordinators received identical instructions for conducting of interviews and assigning ratings to tutors' practices. They interviewed tutors from sites other than their own to prevent their having to rate tutors who were under their supervision. All rating data were translated to numerical form by one staff member, using all ratings and

accompanying comments on interview forms. It should be noted that a different staff member scored the ABLE posttests. All data were merged by the outside evaluator and subjected to statistical analysis.

EVIDENCE OF IMPACT:

As noted previously, the primary objective of the project is to raise the literacy levels of adult basic education students through process-oriented, diagnostic-prescriptive instruction by trained tutors. Data on reading gains of students are summarized in Table 1, which gives the mean pretest and posttest scores*, the standard deviations and Fisher t-test of significant differences for correlated means.

TABLE I: MEANS AND STANDARD DEVIATIONS

PRE AND POSTTEST ABLE READING

	MEAN	STANDARD DEVIATION	N
PRETEST	23.67	13.51	67
POSTTEST	38.56	12.71	67
PRETEST TO POSTTEST GAIN	14.69,	= 12.37; p $<$ .001 (66 df)	

Impact of the project involves not only the size of raw score gain, but the prediction of the gain from program effects. The significance of the correlation coefficient (R) and of the regression coefficient (b) from the multiple regression equation of the program effects (see preceding section) determines the statistical significance of the prediction, hence the impact. The significance of R and of b are dependent upon the power of the significance test. In this instance, power is affected primarily by the size of the standard error and the number of degrees of freedom (number of cases minus one).

*Adult tests do not have normative data for computing NCEs or standard scores therefore, these data consist of raw scores.

In the present project, there were 67 participants enrolled in a program which was measured using 29 program variables. Additionally, five participant characteristics were considered important to reduce the effect of extraneous variables. This combination of cases and variables leaves 32 degrees of freedom (67 cases - 29 program variables - 5 participant characteristics - 1).

Rather than have redundancy and overlap, with resultant loss of degrees of freedom, those non-overlapping variables which accounted for a large percentage of the variance were identified through factor analysis. The interpretation of the nine identified factors with regression coefficients is shown in Table II (see page 14). These factors combined with participant characteristics predict a significant portion of the variance of the residual posttest scores. The multiple correlation coefficient (R) is 0.69. A coefficient of this magnitude would be expected to occur by chance less than one time in a thousand with a sample of this size.

The first factor, Program Implementation, provides the primary basis for claims of effectiveness of the staff development program, as reflected in student achievement. It is noteworthy that this factor has a b-weight coefficient of 5.333 which yields an F-value of 12.249. Such an F value with 14 and 52 degrees of freedom would be expected to occur less than one in one-thousand times by chance alone. These statistical reliability estimates of significance provide strong evidence that the effects cannot reasonably be attributed to chance, and therefore, can be attributed to the effects of the program.

Data from the Modified Coopersmith self esteem inventories were subjected to the same statistical analyses with very similar results to those found in the area of reading achievement. The factor which

weighted most heavily on prediction of residual posttest scores was, again, program implementation.

EVIDENCE THAT THE EFFECTS ARE EDUCATIONALLY MEANINGFUL:

Judgments of educational significance involve both objective and subjective considerations. An empirical rule of thumb proposed for projects being submitted to the JDRP is that gains consist of at least one-third of a standard deviation. Within this project, the mean gains exceed one full standard deviation (see Table I). Previous research with adult populations has provided insufficient base-line data to draw conclusions about educational significance solely on the basis of mean gains (see Development of the Evaluation Study, p. 5).

A review of the literature dealing with adult literacy reveals a striking absence of documentation concerning the relationship between specified staff development programs and student achievement. This project represents an attempt to specify and measure effectiveness of a staff development instructional program based on contemporary knowledge of the psycholinguistic nature of literacy acquisition. The contributions of this project to the field of adult literacy education include: 1) the development of a unique research design which overcomes many of the obstacles to conducting field-based research on adult programs, 2) the successful specification and application of a process-oriented staff development model, and 3) the proof of effectiveness of this training program as reflected in student gains.

EVIDENCE THAT THE EFFECTS ARE ATTRIBUTABLE TO THE PROJECT:

To demonstrate the posttest scores, after removal of the pretest effects, are attributable to the project, it is necessary to answer the following questions: 1) is there evidence of a statistically significant effect (regression coefficient b) and 2) is the effect a coefficient

MULTIPLE REGRESSION EQUATION TO PREDICT TRUE SCORE RESIDUAL READING EFFECTS

VARIABLE	b Weight	F Value
FACTOR I - PROGRAM IMPLEMENTATION	5.333	12.249**
Administration of IRI		
Interpreting of IRI		
Assignment of Reading Stage		
Primary Approach (Instruction)		
Supplementary Approach (Instructional)		
Word Study (Instructional)		
Writing (Instructional)		
Record-keeping (Instructional)		
Monitoring Program (Supervision)		
FACTOR II - GRADUATE PREPARATION AND ASSISTANCE	0.068	0.002
Availability of Site Coordinator		
Graduate Credits in Reading		
Graduate Course in Foundations		
Foundations Taken as Staff Development		
Remediation Course Taken		
FACTOR III - GRADUATE VS. UNDERGRADUATE TUTORS	-1.274	0.690
Tutor Classification		
Undergraduate Credits in Reading		
Graduate Course in Foundations		
Undergraduate Course in Foundations		
Tutor Assistance Received		
Assignment of Reading Stage		
FACTOR IV - PROJECT MANAGEMENT	0.762	0.174
Administration of IRI		
Availability of Site Coordinator		
Record-keeping by Site Coordinator		
Site Coordinator Contact with Project Director		
FACTOR V - FORMAL READING TRAINING	-0.135	0.041
Tutor Classification		
Graduate Credits in Reading		
Remediation Course Taken		
Clinic Course in Reading Taken		
Attended Staff Development Session 2		

VARIABLE	b Weight	F Value
FACTOR VI - TUTOR ATTENTION TO TASK	0.534	0.111
Frequency of Tutoring Session		
Planning Student Progress		
Tutor Classification		
Attended Staff Development Session 2		
Attended Staff Development Session 3		
Prior Tutoring Experience		
FACTOR VII - TESTING SUPERVISION	1.384	0.722
Interpreting the IRI		
Frequency of Tutoring Sessions		
Primary Approach		
Monitoring Program (Supervision)		
Supervision of Diagnostic Testing		
FACTOR VIII - EXPERIENCE	0.555	0.795
Record-keeping by Tutor		
Prior Teaching Experience		
Prior Tutoring Experience		
FACTOR IX - STAFF DEVELOPMENT	-0.412	0.049
Attended Staff Development Session 1		
Prior Tutoring Experience		
PARTICIPANT SEX	0.028	0.000
WEEKS PARTICIPANT ENROLLED	0.084	0.320
PARTICIPANT EMPLOYMENT STATUS	-0.854	0.501
LAST YEAR OF FORMAL SCHOOL ATTENDED	0.431	1.866
PARTICIPANT AGE	-0.143	2.666
CONSTANT (a VALUE)	-11.513	

NOTE: Listed under each factor are the variables which load significantly ($p < .01$) on those factors, and therefore are the definition of those factors.

**: Signifies $F_{(14,52)} = 12.249$; $p < .001$

TABLE 11

of a meaningful independent variable? In this instance, there clearly is one statistically significant coefficient of a meaningful independent variable: Program Implementation ($F_{(14,52)} = 17.249$; $p < .001$).

EVIDENCE OF TRANSPORTABILITY:

The Reading Academy project is being implemented in six locations in a predominantly rural area surrounding a university. Results of the evaluation study showed consistency within these six sites, which contained moderately diverse and distinct populations including inmates of a correctional institution, residents of small rural communities, and residents of a city of 61,572. Premature termination of project funding prevented the replication of the program at branch campuses of the state university. (This was to have occurred during 1982-84.) However, the basic features of the Reading Academy Model of Instruction have been used in two previous community based Right to Read adult literacy projects administered by the University of Southern Maine (1972-75, 1979-80). Although the evaluations of these programs were less rigorous than that of the current project, their marked success led to the development and wide use of staff development materials by the Office of Education.

It must be noted that the project requires faithful implementation in order for it to be generalizable. There is every reason to believe that well trained tutors, complying with the Reading Academy Model practices and procedures, will achieve marked gains in literacy with adult basic education populations. The key to success appears to be careful training and supervision of tutors to ensure complete adherence to the model program, for that is where the Reading Academy evaluation detected significant results.